

Group A Streptococcus (GAS) Outbreak Among AIT Trainees at Fort Gordon, GA: Findings & Recommendations from the USACHPPM Epidemiologic Consultation (EPICON) Team

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Background: Within the first week of April 2007, two cases of invasive Group A Streptococcus (GAS), 1 resulting in complicated pneumonia and the second in necrotizing fasciitis, occurred among the 447, B company advanced individual training (AIT) unit at Fort Gordon. The preventive medicine chief formally requested an epidemiologic consultation (EPICON) from USACHPPM on 11 April

Methods: An environmental assessment of the B 447 barracks was conducted and 657 (80%) of trainees and instructors were surveyed to identify potential risk factors. Mass Bicillin prophylaxis of the affected company was initiated on 13 April. Active case finding through abstraction of on-site medical/laboratory data and Defense Medical Surveillance System (DMSS) data as well as chart review was performed from Jan 2006 through 13 April 2007.

Results: Eight probable and confirmed invasive GAS cases were identified from Fort Gordon during the time period evaluated. Elevated rates of acute respiratory disease (ARD) like diagnoses and GAS were observed among AIT units as compared to non-AIT active duty members stationed at Ft. Gordon. Crowding was determined to be problematic for AIT units, particularly for the affected B 447. History of respiratory illness which impacted basic training was the only factor identified from the survey that was significantly associated with reported respiratory illness.

Conclusions/Recommendations: The following recommendations were made to reduce disease transmission/recurrence: reduce crowding in barracks; segregate identified ARD cases; ensure routine maintenance of ventilation systems; reduce spread of droplets (e.g. cough etiquette, masks, etc.); mass prophylaxis of the affected company with 7 weeks tandem prophylaxis for incoming trainees, and a second mass prophylaxis in the event that new invasive GAS cases occurred; and increased surveillance for ARD, particularly GAS, to include implementation of the ARD surveillance system used at Army basic training sites to track ARD on a weekly basis and identify emerging outbreaks.

Background

- Group A Streptococcus (GAS) is a common bacteria found on the skin; most often causing minor illnesses such as sore throat ("strep throat").
- Rates of acute respiratory disease (ARD) like conditions which includes GAS have historically been problematic in military training environments such as basic combat training (BCT) and advanced individual training (AIT), and can significantly impact training.
- With the discontinuation of the adenovirus vaccine and recent shortages in Bicillin, ARD rates are increasing.
- To date, only BCT posts actively monitor ARD to detect emerging
- Severe or Invasive GAS is relatively uncommon and may include: Streptococcal Toxic Shock Syndrome (STSS), Necrotizing Fasciitis (NF), pneumonia, cellulitis, abscesses, etc.
- Invasive GAS disease has increased since the 1980s, with new strains emerging.
- Overall case fatality rates range from 15-20% (30-70% in STSS). Cases are usually sporadic, and believed to be spread to sites of minor trauma (e.g. penetrating, blunt, muscle strain).
- The occurrence of 2 invasive GAS cases clustered in the B 447 AIT company at Fort Gordon during April 2007 was an uncommon and serious event that prompted the epidemiologic investigation or EPICON described.

- Retrospective and prospective case finding for invasive GAS cases among Fort Gordon active duty (AD) members and beneficiaries from 1 Jan 2006 – 13 April 2007 was conducted.
- Patient charts of suspected invasive cases were reviewed to determine if they met the case definition. Table 1
- "ARD-like" and GAS rates for non-AIT and AIT servicemembers stationed at Fort Gordon were determined based on review of inpatient, outpatient, lab, and personnel records.
- Methods used to track ARD-like conditions in basic training were implemented to identify ARD-like rates above the recommended
- Data sources included:
- Defense Medical Surveillance System (DMSS)
- Fort Gordon Patient Administration Department (PAD)
- Fort Gordon Composite Health Care System (CHCS) labs Armed Forces Health Longitudinal Technology Application (AHLTA) patient notes
- Electronic Military Personnel Office (eMILPO)
- A risk assessment survey was administered to all available B 447 members and instructors; respondents who had a documented GAS+ lab result or reported respiratory symptoms, a fever >100.5 and limited duty were considered ARD-like cases for this analysis.
- An environmental assessment of the affected B 447 barracks was conducted. Isolates for recent positive invasive GAS cases were sent to the
- CDC for subtyping.

Table 1. Invasive GAS Case Definitions

Confirmed: Clinically consistent with invasive GAS and positive GAS culture from a normally sterile site

Probable: Clinically consistent with invasive GAS and concurrent GAS isolation from other site or GAS as most likely agent (e.g., peri-tonsillar abscess) Suspect: Clinically possible, but no positive GAS culture confirmation

- 8 confirmed or probable invasive GAS cases were identified from 1 Jan 2006 – 13 Apr 2007; the first case being detected in July 2006.
- Five cases were servicemembers and 3 were beneficiaries. The fifth case in Feb 2007 may have been a missed sentinel event. > The 2 invasive cases from B 447 were subtype emm18.
- ARD-like rates were elevated among AIT trainees as compared to the remainder of the active duty population at Fort Gordon, with rates declining shortly after mass prophylaxis. In early 2006 rates among AIT trainees were elevated enough to have prompted an investigation had a surveillance system been in place. Figure 2
- GAS rates were also elevated among AIT trainees, peaking in Mar 2007. Figure 3
- The primary risk factor identified during the environmental inspection was crowding; sampled rooms ranged from 44 to 59 ft2 per individual.
- Crowding was problematic among AIT trainees, particularly among the affected B 447 company where the population more than doubled in size in the last few weeks of 2006. Figure 4
- The risk assessment survey was administered to 657 B 447 members or 80% of the company; 44 (6.7%) met the ARD case definition; individuals who reported missing basic training due to ARD were statistically more likely to develop an ARD during AIT (OR 3.5 CI 1.8-6.6). Table 2

Figure 1. Invasive GAS Cases, Ft Gordon, 1 Jan 2006 - 13 April 2007

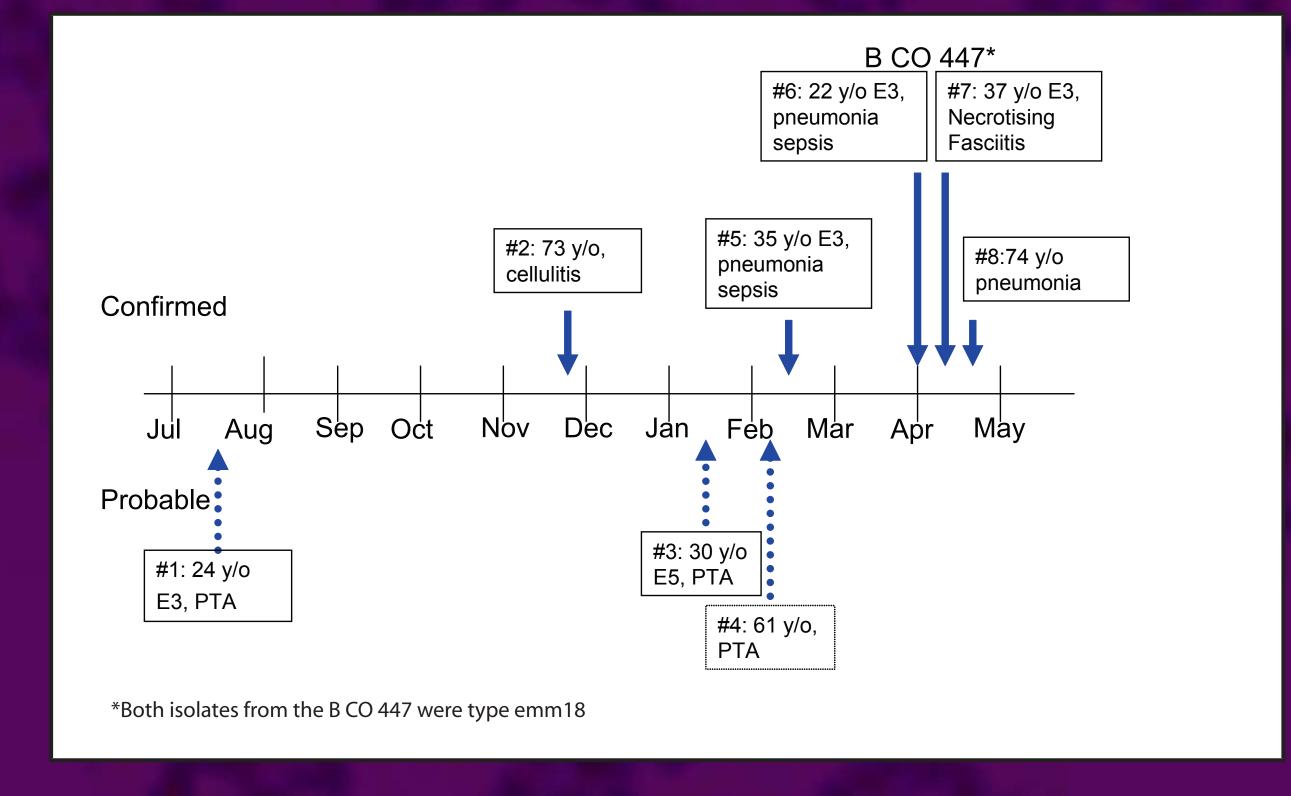


Figure 2. ARD-Like Rates by Training Status, 1 Jan 2006 - 31 May 2007

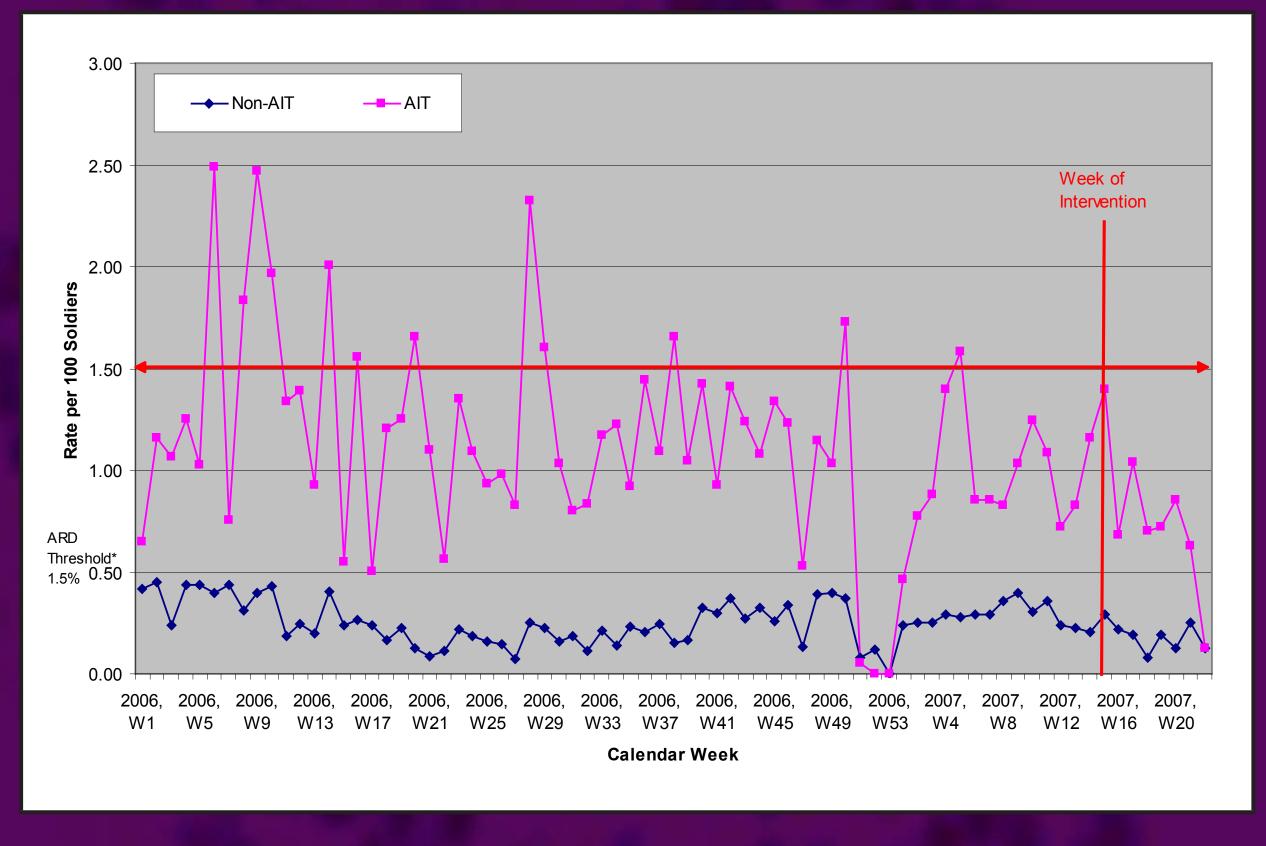


Fig 3. GAS Lab Confirmed Rates, Ft Gordon AD Soldiers, Jan 2006 - April 18, 2007

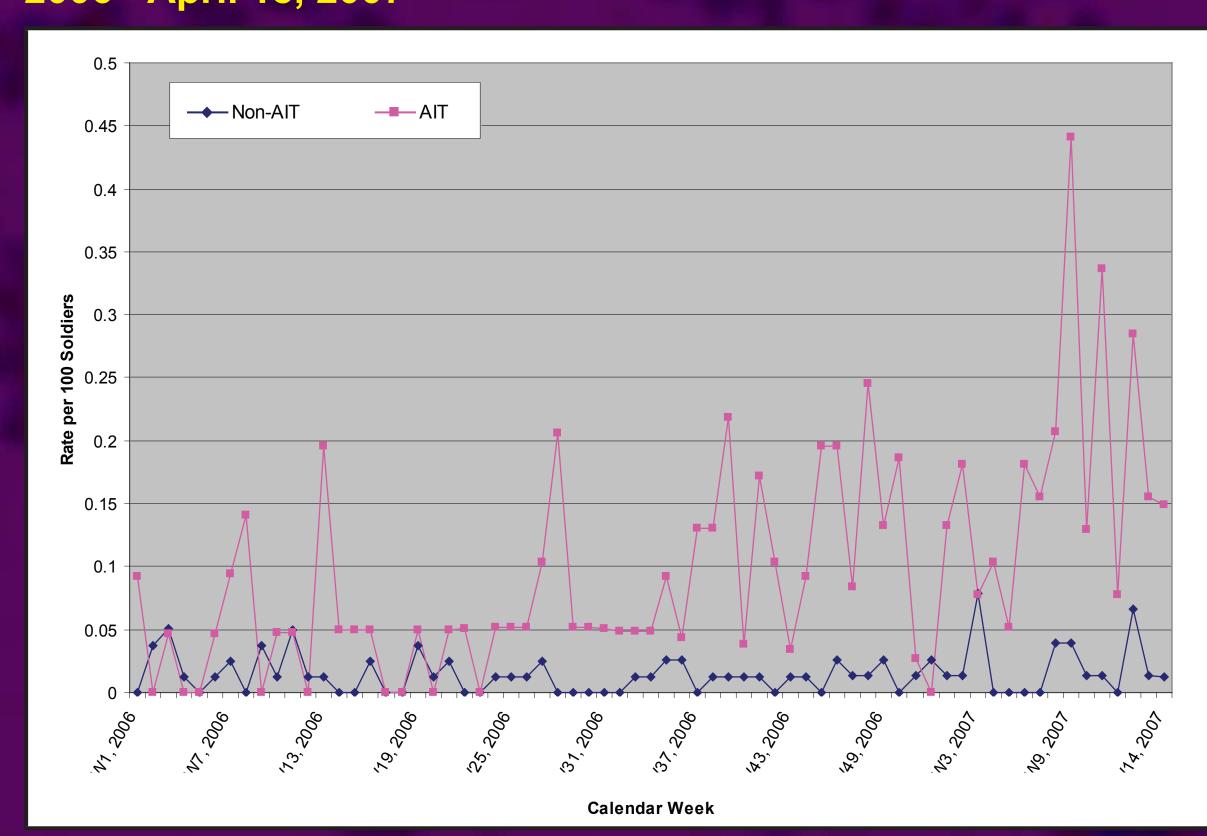


Figure 4. B447 GAS Rates and Population Dynamics, Jan 2006

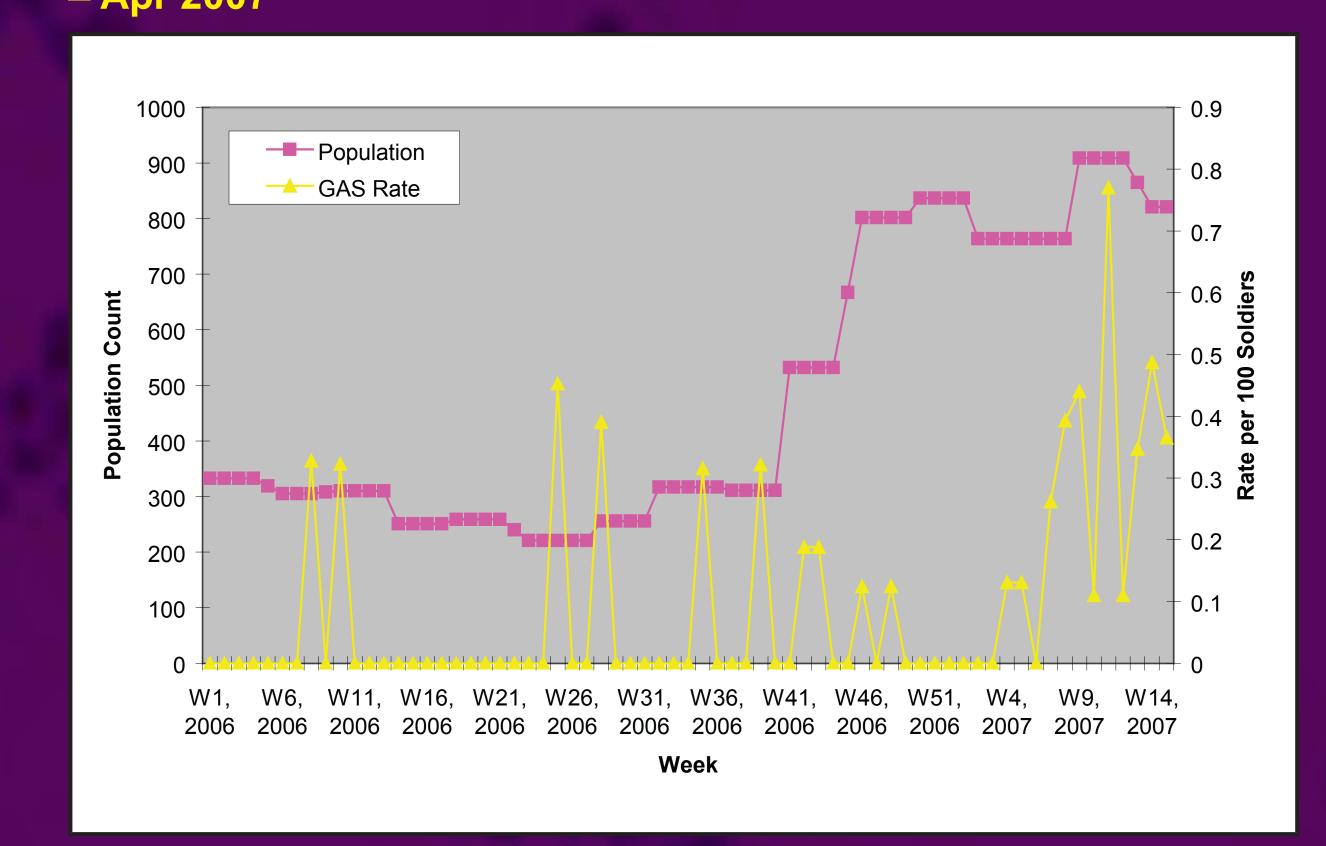


Table 2. B Company Survey Responses and Lab Results (N=657)*

Survey item	Frequency	Percent	Significance**
Gender:	127	19.7	NS
Female Male	517	80.3	NS NS
Age:	017	00.0	110
<20	291	45.8	NS
20-24	240	37.7	NS NO
25+ Racio Training Sito:	105	16.5	NS
Basic Training Site: Fort Jackson	358	55.6	NS
Fort Benning	212	32.9	NS
Fort Sill	37	5.7	NS
Fort Knox	19	3.0	NS
Fort Leonard Wood	17	2.6	NS
Missed 1 or more days of basic training due to respiratory illness	139	21.6	OR 3.5 CI 1.8-6.6
Prescribed Antibiotics within the past 4 weeks	116	17.9	NA
Sought medical care for symptoms within the past 4 weeks	149	32.7	NA
Unable to wash hands due to lack of soap or hand sanitizer 1 or more times within the past week	346	54.2	NS
Smoked within the past 4 weeks	250	38.1	NS
Met ARD case definition if	44	6.7	NA
during the past 4 weeks: (Had cold symptoms AND	413	63.1	NA
Fever >100.5 AND	35	5.3	NA
Missed training for	44	6.7	NA
1+ days due to cold			
symptoms)			
OR Lab confirmed GAS	28	4.3	NA
Lab Collillieu GAS	۷٥	4.3	IN/A

nificance based assciation with ARD case definition; NS= Not statistically significant; NA= Not applicable

Recommendations

- Mass prophylaxis of B 447 Company on 13 Apr
- Provide tandem prophylaxis to incoming students from 16 Apr
- Continue tandem prophylaxis for 7 weeks
- Initiate second mass prophylaxis if additional severe invasive cases occur

Environmental

- Reduce crowding in barracks
- 72 square feet per person of usable space is standard When possible maximize space between individuals in:
- Barracks (allow at least 3 feet between bunks) Classrooms & other crowded environments
- Segregate cases (if not admitted)
- Febrile ARD should be segregated
- Place the patient in a private room.
- If private rooms are unavailable, cohort patients who have active infection with the same microorganism but with no other infection.
- If privacy and cohorting are not achievable, maintain spatial separation of at least 3 ft between the infected patient and others.

Ventilation

- Fort Gordon Industrial Hygienist (IH) coordinate to ensure routine maintenance and repairs are occurring
- Droplet precautions
- Cover coughs and sneezes
- Hand Hygiene
- USACHPPM Tech Guide 314 and other USACHPPM health information products

- Continue enhanced surveillance, immediately report invasive cases to preventive medicine (PM)
- Continue Fort Gordon policy to admit febrile barracks dwellers (FBD) to the Army medical center (AMC), and provide weekly FBD count to PM
- > Implement ARD Surveillance system on a trial basis Monitor rate of ARD cases (clinical cases)
- Monitor proportion of positive cultures due to GAS (SASI)
- Respond if 1.5% ARD threshold or 25% SASI exceeded for 2 consecutive weeks
- Increase use of laboratory testing test all FBD for GAS
- Submit GAS isolates to Naval Health Research Center (NHRC) for further analysis

Invasive GAS is an uncommon and severe event that warrants further investigation. As a result of the GAS investigation at Fort Gordon EPICON team members found elevated ARD-like and GAS rates among the AIT students, as well as contributing factors such as crowding. For this particular outbreak, the intervention accompanied by seasonal variations led to the reduction of disease burden in the subsequent months. Environmental interventions such as those recommended to reduce crowding and cohort symptomatic/febrile cases are necessary to prevent a seasonal recurrence. Additionally, enhanced surveillance such as the ARD surveillance program used at basic training should be implemented at Fort Gordon and potentially other AIT sites on a trial basis through the next respiratory disease season.





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